

## REMARKS

Claims 1-27 are pending in the application. Claims 1, 8, 14, and 22 are independent. By the foregoing Amendment, claims 1-3, 5-10, 12-16, 18, 20-22, and 24-27 have been amended. These changes are believed to introduce no new matter and their entry is respectfully requested.

### Rejection of Claims 1, 8, and 22 Under 35 U.S.C. §112, Second Paragraph

In paragraph 2, the Examiner rejected claims 1, 8, and 22 under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter that the applicant regards as the invention. Specifically, the Examiner states that it appears that the buried tapered waveguide and the tapered rib waveguide are the same waveguide but are claimed as separate waveguides. By the foregoing Amendment, Applicants have amended claims 1, 8, and 22 to accommodate the Examiner. Accordingly, Applicants respectfully request that the Examiner reconsider and remove the rejection to claims 1, 8, and 22

### Rejection of Claims 1-21 Under 35 U.S.C. § 103(a)

In the Office Action, the Examiner rejected claims 1-21 under 35 U.S.C. §103(a) as being obvious over U.S. Patent No.6,174,748 B1, to Jeon et al. (hereinafter “Jeon”) in view of U.S. 6,030,540 to Yamamoto et al. (hereinafter “Yamamoto”). Applicants respectfully traverse the rejection.

To establish a *prima facie* case of obviousness, an Examiner must show three things: (1) that there is some suggestion or motivation to modify a reference or combine reference teachings to arrive at the claimed invention, (2) that there must be a reasonable expectation of success, and (3) that the references teach or suggest each and every element of the claimed invention. (MPEP §2143).

Representative claim 1 recites in pertinent part “*a dual taper waveguide* device disposed in a semiconductor layer, the dual taper waveguide device *having*: a buried tapered waveguide section disposed in the semiconductor layer; and *a tapered rib waveguide section* disposed in the semiconductor layer and having *a common core* with the buried tapered waveguide portion... *the buried tapered waveguide portion being beneath the slab portion* of the tapered rib

waveguide section" (emphasis added). Support for these changes according to at least one embodiment can be found in Applicants' Specification at page 15, lines 5-12, and Figure 12.

*Jeon* does not appear to teach or fairly suggest a dual taper waveguide device having a buried tapered portion sharing a common core with a tapered rib portion and being beneath the buried tapered portion. In *Jeon*, the tapered portion 14A is not beneath a slab portion. The tapered portion 14A appears to be within the ridge portion. Also, *Jeon* appears to have two distinct waveguide core layers 22 and 24, both of which appear to be in the slab area not the ridge area. The two layers 22 and 24 also are separated by a thin InP etch-stop layer 23 and the layer 22 is made from "similar material" as the main waveguide layer 24. This implies that the layer 22 is different from the layer 24. Thus, there is no common core material either.

Applicants respectfully submit that *Yamamoto* fails to make up for the deficiencies in *Jeon*. For example, *Yamamoto* does not teach or fairly suggest a dual taper waveguide device having a buried tapered portion sharing a common core with a tapered rib portion and being beneath the buried tapered portion. Accordingly, Applicants respectfully submit that *Jeon* and/or *Yamamoto* either separately or in combination fail teach or suggest each and every element of claims 1, 8, and/or 14. Applicants respectfully submit therefore that claims 1, 8, and/or 14 are not obvious over *Jeon* in view of *Yamamoto*. Because claims 1, 8, and/or 14 are not obvious in light of *Jeon* in view of *Yamamoto*, Applicants respectfully submit that claims 1, 8, and/or 14 are patentable over *Jeon* in view of *Yamamoto*.

Claims 2-7 properly depend from independent claim 1, claims 9-13 properly depend from independent claim 8, and claims 15-21 properly depend from independent claim 14, which independent claims Applicants respectfully submit are patentable over *Jeon* in view of *Yamamoto*. Accordingly, Applicants respectfully submit that claims 2-7, 9-13, and 15-21 are patentable for at least the same reasons that claims 1, 8, and 13, respectively, are patentable. (MPEP §2143.03 (citing *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir.1988)). Accordingly, Applicants respectfully request that the Examiner reconsider and remove the rejection to claims 1-13 and 14-21.

Rejection of Claims 6-7, 11, 16-19, and 26-27 Under 35 U.S.C. § 103(a)

In the Office Action, the Examiner rejected claims 6-7, 11, 16-19, and 26-27 under 35 U.S.C. § 103(a) as being unpatentable over *Jeon* in view of *Yamamoto* in further view of U.S. Patent No. 6,819,814 B2, to Forrest et al. (hereinafter “*Forrest*”). Applicants respectfully traverse the rejection.

Claims 6-7 properly depend from independent claim 1, claim 11 properly depends from independent claim 8, and claims 16-19 properly depend from independent claim 14, which independent claims Applicants respectfully submit are patentable. Accordingly, Applicants respectfully submit that claims 6-7, 11, and 16-19 are patentable for at least the same reasons that claims 1, 8, and 13, respectively, are patentable. (MPEP §2143.03 (citing *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)). Accordingly, Applicants respectfully request that the Examiner reconsider and remove the rejection to claims 6-7, 11, and 16-19. Claims 26-27 will be discussed below with respect to independent claim 22.

Rejection of Claims 22-27 Under 35 U.S.C. § 103(a)

In the Office Action, the Examiner rejected claims 22-27 under 35 U.S.C. § 103(a) as being unpatentable in light of *Jeon* in view of *Yamamoto* in further view of U.S. Patent Application No. 2003/0031443 to Soljacic et al. (hereinafter “*Soljacic*”). Applicants respectfully traverse the rejection.

Amended independent claim 22 recites in pertinent part “*a dual taper waveguide* device disposed in a semiconductor layer, the dual taper waveguide device *having*: a buried tapered waveguide section disposed in the semiconductor layer; and *a tapered rib waveguide section* disposed in the semiconductor layer and having *a common core* with the buried tapered waveguide portion... *the buried tapered waveguide portion being beneath the slab portion* of the tapered rib waveguide section” (emphasis added). Support for these changes according to at least one embodiment can be found in Applicants’ Specification at page 15, lines 5-12, and Figure 12.

As discussed above, *Jeon* and *Yamamoto* alone or in combination do not appear to teach or fairly suggest a dual taper waveguide device having a buried tapered portion sharing a common core with a tapered rib portion and being beneath the buried tapered portion. *Soljacic* does not make up for the deficiencies in *Jeon* and *Yamamoto* in that *Soljacic* also does not teach or fairly suggest a dual taper waveguide device having a buried tapered portion sharing a common core with a tapered rib portion and being beneath the buried tapered portion as recited in claim 22. Accordingly, Applicants respectfully submit that *Jeon*, *Yamamoto*, and *Soljacic* either separately or in combination fail teach or suggest each and every element of claim 22. Applicants respectfully submit therefore that claim 22 is not obvious in light of *Jeon* in view of *Yamamoto* in further view of *Soljacic*. Because claim 22 is not obvious in light of *Jeon* in view of *Yamamoto* in further view of *Soljacic* Applicants respectfully submits that claim 22 is patentable over *Jeon* in view of *Yamamoto* in further view of *Soljacic*.

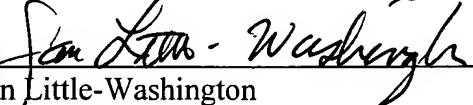
Claims 23-27 properly depend from independent claim 22. Accordingly, Applicants respectfully submit that claims 23-27 are patentable for at least the same reasons that claim 22 is patentable. (MPEP §2143.03 (citing *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)). Accordingly, Applicants respectfully request that the Examiner reconsider and remove the rejection to claims 22-27.

## CONCLUSION

Applicants submit that all grounds for rejection have been properly traversed, accommodated, or rendered moot, and that the application is in condition for allowance. The Examiner is invited to telephone the undersigned representative if the Examiner believes that an interview might be useful for any reason.

Respectfully submitted,  
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN

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